

APPLICATION FOR UNITED STATES LETTERS PATENT

JOINT INVENTORS

TO ALL WHOM IT MAY CONCERN:

Be it known that we, Donald K. Wright, a U.S. citizen, residing at 3750 Viola Lane, Murphysboro, Illinois 62966; Christopher L. Pemberton, a U.S. citizen, residing at 909 N. Market Street, Marion, Illinois 62959; and James K. Hankins, a U.S. citizen, residing at 602 W. Illinois Avenue, Carterville, Illinois 62918, have invented a new and useful **“RECLOSABLE FASTENER PROFILE SEAL AND METHOD OF FORMING A FASTENER PROFILE ASSEMBLY”**, of which the following is a specification.

RECLOSABLE FASTENER PROFILE SEAL AND METHOD OF FORMING A FASTENER PROFILE ASSEMBLY

BACKGROUND OF THE INVENTION

5 The invention relates generally to reclosable fasteners and a method of forming a reclosable fastener profile assembly which allows for fast, automated production and accurate seal registration. In particular, the invention relates to a seal arrangement for a reclosable zipper profile strip which is created through the application of heat and pressure to a male and female profile to form a 'compression molded segment' seal, and
10 to a method of producing such a seal.

 The popularity of reclosable zipper fasteners has created a demand for a large number and wide variety of reclosable bag sizes and types. It is commonly known in the art to form a reclosable bag through the addition of a zipper profile to a pair of bag walls in order to form a bag with a reclosable, airtight seal. However, improper registration
15 may cause the seal to weaken and fail over time or become permeable to the air. In many reclosable bag applications, an airtight seal is necessary to maintain the freshness of articles placed in the bag. Further, such seals must be suitable for high-speed automated production in order to make the production of reclosable bags commercially viable.

 In the case of zipper profiles, commonly known methods of construction and seal
20 formation often cause inaccurate, commercially unacceptable seals which cannot be produced on an economically practical scale. Commonly known profile formation methods in the art require multiple sealing devices, precise machinery or extensive retooling to alter the size and type of reclosable fastener. Exemplary devices are shown and described in United States Patent Nos. 5,601,368 (Bodolay); 3,847,711 (Howard);

5,461,845 (Yeager); 5,823,933 (Yeager); 4,241,865 (Ferrell); 4,335,817 (Bahr); 4,909,017 (McMahon); and 5,024,537 (Tilman). As such, none of the devices referenced above satisfy the need for a multi-purpose reclosable zipper profile which can be accurately and economically manufactured.

5 Therefore, an unfulfilled need remains for a zipper profile which can be accurately manufactured at a high rate of speed and which can be adapted to a wide range of reclosable zipper bag applications.

SUMMARY OF THE INVENTION

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10 The present invention provides a reclosable fastener profile seal and a disclosed method of forming a fastener profile assembly. In particular, the preferred embodiment of the method of forming a fastener assembly includes a first profile strip, a second profile strip and a compression molded segment seal fusing the first and second profiles together to provide a reclosable faster having fused ends which form the opening for a reclosable bag. To manufacture the assembly, the first profile strip and second profile

15 strip are fed by at least one motorized roller from a web or roll of respective profile strips. Interlocking ribs are included on the profiles to create an airtight reclosable seal which is suitable for a wide range of applications. The first and second profile strips are engaged to form a reclosable profile assembly. After the first and second profiles are interconnected, a portion of the first and second profile are sealed together. The

20 interconnected first profile and second profiles are advanced and staggered applications of a compression molded segment seal are applied to the end portions of each profile assembly. This allows the profile assembly to be formed at a high rate with good

accuracy. While being fused, the first and second profiles are cut to provide for individual reclosable fasteners.

In an alternative embodiment, the individual reclosable fastener profiles are not cut, thereby providing a continuous linear strip of fully formed reclosable bag profiles. In such an embodiment, the completed reclosable fasteners may be wound onto a roll for later separation and addition to bag walls.

It is a principal advantage of the invention to provide a reclosable fastener profile seal and method of forming a fastener profile assembly that can be produced quickly and precisely to form a zipper profile suitable for use in a wide range of reclosable bag applications.

It is another advantage of the invention to provide reclosable profile assembly and method of forming a reclosable fastener profile assembly which is easily adjustable to provide a reclosable fastener profile of any commercially desirous length.

It is another advantage of the present invention to provide a reclosable profile assembly and method of forming a reclosable fastener profile assembly which is readily adaptable to seal and form reclosable fasteners and profiles of various sizes and styles.

It is yet another advantage of the invention to provide reclosable profile assembly which is suitable for attachment to a wide range of bag wall sizes and types.

Various other features and advantages of the invention are set forth in the following detailed description, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a portion of the profile assembly embodying the invention including the compression molded segment seal.

FIG. 2 is a front elevational view of a portion of the first profile and second profile prior to engagement and fusion.

FIG. 3 is a side elevational view of the first profile of FIGS. 1 and 2.

FIG. 4 is a side elevational view of the second profile of FIGS. 1 and 2.

5 FIG. 5 is a perspective view of the first and second profiles including the sealing apparatus that forms the compression molded segment seal and a single compression molded segment seal.

FIG. 6 is a perspective view of the first and second profiles including the compression molded segment seal formed in FIG. 5 and the formation of a second
10 compression molded segment seal.

FIG. 7 is a front elevational view of a reclosable bag including the profile seal disclosed in Figs. 1 through 6.

FIG. 8 is a perspective view of a reclosable bag including the profile seal disclosed in Figs. 1 through 6.

15 FIG. 9 is a flowchart of the method of forming a reclosable fastener profile assembly disclosed in Figs. 1 through 6.

FIG. 10 is a flowchart of an alternative method of forming a reclosable fastener profile assembly also disclosed in Figs. 1 through 6.

While the specification and claims herein may refer to specific fastener or rib
20 structures, it will be understood and fully appreciated that the principles of the present invention refer to closures generally and incorporate any compatible closure type or style. As such, before one embodiment of the invention is explained in detail, it is to be understood that the invention is not limited in its application to the details of the

construction and the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As seen in FIGS. 1 through 4, the reclosable profile assembly 10 as disclosed in the present embodiment includes a first profile 14, a second profile 18 and a compression molded segment seal 22. The profile assembly 10 has a length which may be reduced or enlarged in accordance with the present application to accommodate any length required by a particular industry application.

The profile assembly 10 includes a first profile 14. The first profile 14 is flat, thin piece of packaging material preferably manufactured from polyethylene. As most clearly depicted in FIGS. 1, 2, 3 and 4, the first profile 14 includes a first profile surface 26 including an end 28, a first rib 30, second rib 34 and third rib 38. The first rib 30, second rib 34 and third rib 38 are in a location offset from the center of the first profile 14, thereby defining a profile adherence surface 42 between ribs 30, 34, 38 and the edge 44 of the first profile strip 14. As seen in FIGS. 1 through 4, the first rib 30, second rib 34 and third rib 38 of the first profile 14 extend the entire length of the first profile surface 26.

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~~The second profile 18 is preferably manufactured from the same material and with the same dimensions as the first profile 14. As best depicted in FIG. 2, the second profile~~

18 includes a second profile surface 46 including an end 48, first rib 50, second rib 54 and third rib 58. As best depicted in FIG. 4, the first rib 30, second rib 34 and third rib 38 are located along one edge 40 of the second profile 18. As seen in FIGS. 1 through 4, the first rib 30, second rib 34 and third rib 38 of the second profile 18 extend the entire length of the second profile surface 46.

As seen in FIG. 1, the completed profile assembly 10 also includes a compression molded segment seal 22 portion. The compression molded segment seal 22 comprises the profile adherence surface 42 of the first profile surface 26 fused to the portion of the second profile surface 46 which engages the profile adherence surface 42 and a portion of the first 30, second 34 and third 38 ribs of the first profile surface 14 and the corresponding engaged portion of the first 50, second 54 and third ribs 58 of the second profile surface 46. In the embodiment depicted, the compression molded segment seal 22 portion has a thickness less than the combined thickness of the individual first profile 14 and second profile 18.

The formation of the profile assembly 10 and compression molded segment seal 22, as depicted in FIGS. 5 and 6, is accomplished by providing a continuous supply of an interconnected first profile 14 and second profile 18 where the ribs 30, 34, 38 of the first profile 14 are engaged with the ribs 50, 54, 58 of the second profile 18.

As seen in FIG. 5, the engaged first profile 14 and second profile 18 are fed or otherwise positioned in proximity to the compression molded segment sealer 62. The compression molded segment sealer 62 provides heat and pressure to the profile assembly 10 to form the compression molded segment seal 22.

As seen in FIG. 6, the engaged first profile 14 and second profile 18 are repositioned 82 with the first compression molded segment seal 22 advanced 82 past the compression molded segment sealer 62. The second compression molded segment seal 24 is formed, defining the second compression molded segment seal 24 of the completed profile assembly 70 and the first seal 22 of a second incomplete profile assembly 78. While the second compression molded segment seal 24 is being formed, the first profile 14 and second profile 18 are simultaneously cut 60 by the compression molded segment sealer 62 to define the completed profile assembly 70 and form a portion of the first compression molded segment seal 22 for a second incomplete profile 78. The area between the first compression molded segment seal 22 and second compression molded segment seal 24 defines the opening 80 of the reclosable bag profile 70 (as seen in FIG. 8). The second incomplete profile 78 depicted in FIG. 4 is advanced 82 and the process (as depicted in FIGS. 9 and 10) is repeated to form an additional completed profile assembly 70 (as shown in FIGS. 7 and 8).

As seen in FIGS. 7 and 8, a reclosable storage bag 84 is created by fusing or otherwise affixing a completed profile assembly 70 to a first bag wall 72 and second bag wall 74. The completed reclosable storage bag 84 includes a first bag wall 72, a second bag wall 74 and the reclosable fastener profile assembly 70 depicted in FIG. 6. As depicted in FIGS. 8, the reclosable fastener profile 10 and first 72 and second bag walls 74 combine to define a storage bag 84 with a reclosable opening 80.

FIGS. 9 and 10 represent graphically the method of forming a fastener profile assembly 70 disclosed herein. As seen in FIG. 9, the following steps are performed in sequence: first 82, an interconnected profile strip 10 is provided; second 84, heat and

pressure is applied by the compression molded segment sealer 62 to the interconnected profile strip 10 to form a compression molded segment seal 22; and third 86, the profile strip 10 is advanced 82. The second 84 and third 86 steps are then repeated to form additional completed profile assemblies 70.

5 Alternatively, as seen in FIG. 10, the steps 82, 84, 84 depicted in FIG. 9 are duplicated, however, a cutting step 88 is applied after the interconnected first 14 and second 18 profiles are fused 22 during the second step 84. The cutting step 88 cuts 60 the compression molded segment seal 22, thereby defining a second compression molded segment seal 24. The second step 82, cutting step 88 and third step 86 are then repeated
10 sequentially to form additional individual profile assemblies 70.

 In other embodiments (not shown), the reclosable profile assembly 10 may include a peel seal, a frangible seal or other means for detecting tampering. Such means may include any type of known frangible seal which, when broken, is easily detected by the user.

15 Various features and advantages of the invention are set forth in the following claims.